Claim listing:

1. (Original) A semiconductor optical waveguiding device comprising:

a first cladding layer;

a second cladding layer; and

a waveguiding layer disposed between the first and second cladding layers and having a substantially higher refractive index than said first and second cladding layers;

wherein at least one of the first and second cladding layers includes a beam control layer in which a property of the semiconductor material varies as a function of depth through the layer, the beam control layer including a first sub-layer in which the property varies gradually from a first level to a second level, and a second sub-layer in which the property varies gradually from said second level to a third level.

2. (Original) The device of claim 1 in which the third level is substantially equal to the first level.

3. (Currently amended) The device of claim 1 ~~or claim 2~~ in which the property that varies is 20 the composition ratio of the material.

4. (Currently amended) The device of ~~any preceding~~ claim 1 in which the first sub-layer provides a gradually decreasing conduction band edge, and the second sub-layer provides a gradually increasing conduction band edge.

5. (Currently amended) The device of ~~any preceding~~ claim 1 in which the first sub-layer provides a gradually increasing refractive index and the second sub-layer provides a gradually decreasing refractive index.

6. (Currently amended) The device of ~~any preceding~~ claim 1 in which the first and second sub-layers are contiguous.

7. (Currently amended) The device of ~~any preceding~~ claim 1 in which the first level is substantially equal to the level of the property in the adjacent cladding layer.

8. (Currently amended) The device of ~~any preceding~~ claim 1 in which the third level is substantially equal to the level of the property in the adjacent cladding layer.

9. (Currently amended) The device of ~~any preceding~~ claim 1 in which the property of the first sub-layer varies between the first level and the second level in a substantially linear manner.

10. (Currently amended) The device of ~~any preceding~~ claim 1 in which the property of the second sub-layer varies between the second level and the third level in a substantially linear manner.

11. (Currently amended) The device of ~~any preceding~~ claim 1 in which the first and second cladding layers are formed from a GaAs-based or InP-based system.

12. (Currently amended) The device of ~~any preceding~~ claim 1 in which the waveguiding layer is a quantum well layer.

13. (Currently amended) The device of ~~any preceding~~ claim 1 further comprising a substrate, the first cladding layer being a layer most proximal to the substrate, the mode control layer being provided within the first cladding layer.

14. (Original) The device of claim 13 in which the substrate comprises GaAs, the first cladding layer and beam control layer comprises n-type A1GaAs, and the second cladding layer comprises p-doped AlGaAs.

15. (Currently amended) The device of ~~any preceding~~ claim 1 including a ridge waveguide.

16. (Currently amended) The device of ~~any preceding~~ claim 1 in which the property is refractive index, and in which the refractive index is gradually varied in the first and second beam control sub-layers by gradually varying thicknesses of alternating sub-layers of different refractive index, each alternating sub-layer having a thickness substantially less than a wavelength of light.

17. (Currently amended) The device of claim 12 comprising any one or more of a laser, an optical modulator ~~or~~ and an optical amplifier.

18. (Original) A method of forming a semiconductor optical waveguiding device comprising the steps of:

forming a first cladding layer on a substrate;

forming a waveguiding layer on said first cladding layer, the waveguiding layer having a refractive index substantially greater than the first cladding layer;

forming a second cladding layer on said waveguiding layer, the second cladding layer having a refractive index substantially less than the waveguiding layer; and

during the step of forming said first cladding layer, forming a beam control layer therein by gradually modifying deposition conditions so as to vary a property of the semiconductor material as a function of depth through the beam control layer, such that the beam control layer includes a first sub-layer in which the property varies gradually from a first level to a second level, and a second sub-layer in which the property varies gradually from said second level to a third level.